

ABSTRACT OF THE DISCLOSURE

A nanocarbide precipitation strengthened ultrahigh-strength, corrosion resistant, structural steel possesses a combination of strength and corrosion resistance comprising in combination, by weight, about: 0.1 to 0.3% carbon (C), 8 to 17% cobalt (Co), 0 to 5% nickel (Ni), 6 to 12% chromium (Cr), less than 1% silicon (Si), less than 0.5% manganese (Mn), and less than 0.15% copper (Cu), with additives selected from the group comprising about: less than 3% molybdenum (Mo), less than 0.3% niobium (Nb), less than 0.8% vanadium (V), less than 0.2% tantalum (Ta), less than 3% tungsten (W), and combinations thereof, with additional additives selected from the group comprising about: less than 0.2% titanium (Ti), less than 0.2% lanthanum (La) or other rare earth elements, less than 0.15% zirconium (Zr), less than 0.005% boron (B), and combinations thereof, impurities of less than about: 0.02% sulfur (S), 0.012% phosphorus (P), 0.015% oxygen (O) and 0.015% nitrogen (N), the remainder substantially iron (Fe), incidental elements and other impurities. The alloy is strengthened by nanometer scale M_2C carbides within a fine lath martensite matrix from which enhanced chemical partitioning of Cr to the surface provides a stable oxide passivating film for corrosion resistance. The alloy, with a UTS in excess of 280 ksi, is useful for applications such as aircraft landing gear, machinery and tools used in hostile environments, and other applications wherein ultrahigh-strength, corrosion resistant, structural steel alloys are desired.